TALKING TECH TACTICS WITH *FOOTBALL MANAGER** 2011

by John Tyrrell

Visual Adrenaline sucked on a half-time orange with Sports Interactive, the London-based developer of the multi-million-selling PC simulation series *Football Manager**, and talked multi-thread optimization, integrated graphics, and just a little bit of football.

Kick Off

Second only to the terraces surrounding the hallowed turf of the nation's football grounds, the pub is the next most popular choice of natural environment for the British football fan. So it's fitting that the offices of Sports Interactive Ltd, the creators of the world's foremost and multi-million-selling football (soccer) management simulation series, should be located right on top of just such a drinking establishment. With its big screen match coverage and solid draught beer selection, The William Blake pub on Old Street in central London, UK has doubtless born witness to many impassioned discussions about football, and probably just as many again about the game's virtual progeny, the revered *Football Manager* game series, which for many years has been crafted with love and passion in the offices directly above it.

Football Manager is a game that allows players to step into the shoes of the be-suited leaders of beloved teams around the globe and strive for championship victory in any one of 50 major leagues from Hong Kong to Chile, not forgetting football's European heartland of course. Players manage their chosen team, buy and sell players, interact with the press, and plan tactics, all with the ultimate goal of topping the league and filling the boardroom trophy cabinet at the end of the season. The game's 3D match engine lets players watch every match in real-time, taking the game far beyond its previous 2D top-down presentation toward something ever closer to the real thing.

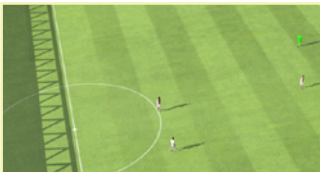
The series has come a long way since its genesis in the imaginations of Paul and Oliver Collyer, two young British football fanatics. In the words of Sports Interactive Senior Producer Grant Appleyard, the brothers' only aim was "to make a game that they could enjoy themselves." Working from their Shropshire bedroom, the pair released the first *Championship Manager** in 1992, a simulation game written in BASIC, a language more commonly associated with school classrooms than high-performance PC software.

From this acorn grew the mighty *Championship Manager* franchise. At its peak, every subsequent release in the series became the fastest selling PC game ever in the UK. Following a switch of publisher from Eidos Interactive to SEGA in 2004 and a name change to *Football Manager* for all subsequent games from Sports Interactive, the team has continued its domination of the genre unabated, with its latest iteration *Football Manager 2011* making its appearance in November 2010 for the PC, joined by *Football Manager Handheld* 2011* for the Sony PlayStation* Portable, the Apple iPhone*, and the Apple iPod touch*. Taking Sports Interactive's vision of "the beautiful game" online, SEGA also released the MMO management sim *Football Manager Live** in 2008.

Today, Paul and Oliver Collyer are far from being ivory tower moguls, with both brothers still rolling up their sleeves and







getting elbow deep in code. Paul is the match engine programmer, while Oliver, or Ov as he's known to the team, is the lead programmer on *Football Manager Live*. Staff turnover is low, passions are high, and the tightly knit team is forever pushing the series forward, embracing the endless tide of new and improving PC technologies to move inexorably toward their vision of the perfect football management simulation.

Match Fit

This is not a series that rests on its laurels, even if its passionate and vocal fan base was prepared to let it (which they're not). The last 20 years have been one long, iterative process—a process that shows no signs of ending any time soon. "If you look at the features that we've added this year, it's something like 450," said Appleyard.

The majority of new features in the game come from the development team itself and are proposed, discussed, and, if they pass muster, implemented in-game through a highly democratic process that involves everyone. Sports Interactive maintains an open database that allows any member of the team to suggest improvements or new additions to the already impressive array of in-game functionality.

One of the important new features to make it through the process and into *Football Manager 2011* is the live Contract Negotiation system. Agents have become a permanent fixture of the footballing world, game players can enter into complex negotiations with different virtual agents to master the minutia of contractual clauses and secure their next big signing.

However, when your fan community is as big and vocal as *Football Manager*'s, the end-users themselves are bound to make countless requests for features. But while requests are plentiful, nothing gets through without the Sports Interactive stamp on it. "We listen to our users and we try to put things in they want, but we'll always give it the Sports Interactive twist. We'll discuss it, thrash it out, plan it, and design it properly here," explained Appleyard.

One such feature that fans have been clamoring for is Dynamic League Reputation, a system which, over extended periods of playing time, allows players who build strong teams to positively affect the reputation of the league they're playing in, ultimately letting them attract star players from elsewhere and bringing a new long-term dimension to the gameplay.

As Appleyard pointed out, the introduction of Dynamic League Reputation is "a good example of a feature that shows the length of time people play the game, because dynamic league reputations can't really kick in until 10 to 15 seasons into the game." With over 400,000 registered users on the game's official forums alone, you don't have to look far for evidence of this fan fervor and commitment.

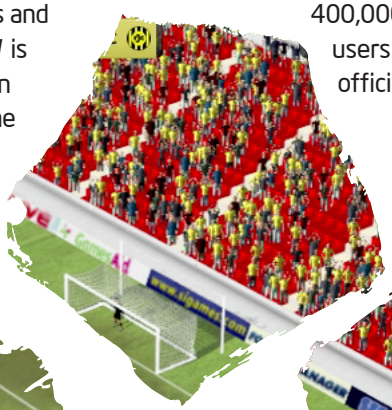
Set Piece

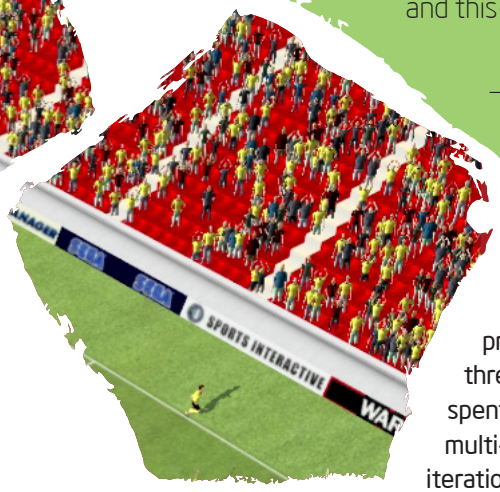
Football Manager is a PC game for which multi-core processing is a massive advantage. The game's match simulator re-creates vast numbers of football matches based on countless variables, with each game requiring its own independent process, demanding that every pass, foul, and goal be calculated for a field of 22 men over 60 minutes.

"We have users that will play the game over a long period of time, and that's when optimizations that speed up the game generally come into their own because they're not sitting looking at the progress bar," explained Appleyard.

"If they're playing an unglamorous lower league team they probably just want to get through the match quickly, but the game still has to compute the match events."

> "We now have the use of this [Intel® Graphics Performance Analyzers] suite of tools across the whole range of Intel target platforms. We can keep running analysis over the lower end, mid end, high end, and in a year's time with the next version of *Football Manager* I think we'll have an improved performance across all Intel® chipsets because of the use of these tools and this extra information that we can now gather."
>
> – GRANT APPLEYARD, SENIOR PRODUCER, SPORTS INTERACTIVE





Such a heavy drain on the CPU can be substantially alleviated by optimizing parallel processing through multi-threading. Sports Interactive has spent many years improving the multi-core optimization in successive iterations of the game, the ultimate goal

being to deliver the fastest player experience with the least waiting around.

"You get to Saturday, it's a big three p.m. kickoff, and all of the leagues are playing their games. The better the game utilizes multi-core CPUs to play separate matches on each core means the less time the computation takes," said Appleyard.

Optimizing the multi-core performance of *Football Manager* is important to Sports Interactive in a PC market where not every title does so as effectively. "Sometimes you find with games that even if you have, say, a quad-core machine it will only use two cores," noted Appleyard, "whereas with our game, the more cores that you add the faster it becomes because it knows how to use those cores in the most efficient manner."

To take a closer look at the scaling that Sports Interactive has achieved with *Football Manager 2011*, Intel software engineer Steve Hughes spent time with the team to run a series of tests using a six-core, 12-thread Intel® Core™ i7 980X processor (formerly code-named Gulftown) machine. The results of the testing showed that the game ran significantly faster comparing identical frequency six-core to four-core systems. Even more impressive was the result comparing two- and four-core systems, where the speed almost doubled.

The boost from two to four cores is especially significant to Appleyard: "If you look at the market and how many people have those sorts of machines, that's the bulk there, so to have that kind of scaling in the key area of the bell curve is great."

One of the main tests the team runs during development is heavy "soak" testing where the game is set on Holiday mode and left to automatically progress through the season. It's a serious test for any processor, and as Appleyard noted, "the fastest performance that I've seen so far was on the Intel machines that we received," a result that reflects as much on the achievements of the development team as it does on the hardware itself.

The optimization of speed performance using multi-threading is a key factor in delivering the best possible end-user game experience, and as Hughes noted, "although *Football Manager* is pretty unique in that it is obviously parallelizable, nevertheless Sports Interactive is showing us the way forward by utilizing the full power of multi-core systems."

The 3D match engine is a relatively new addition to the *Football Manager* series, making its debut in November 2008 in the *Football Manager* 2009 game. The engine lets the user watch entire matches re-created in full 3D with the objective of immersing players in a live match-like experience. Many changes to the engine have been introduced in *Football Manager 2011*, including improved crowd simulation, completely new player models, and a TV camera, which brings the experience closer to watching a real match on television.

As with multi-threading, ensuring it squeezes the optimum performance for the GPU-hungry processes involved in recreating the 3D experience is something that Sports Interactive has long made a priority. Key to the success of *Football Manager* is that it doesn't demand the latest hardware to deliver a great user experience. The graphics engine is optimized to run even on older processors, as Hughes noted after running the game on an old 945 chipset and testing it using the Intel® Graphics Performance Analyzers (Intel® GPA) tools.

Even on a machine that is at the lower end of the minimum spec requirements, the code put in a solid performance, though some minor issues were identified. Referring to the performance of the 945, Appleyard admitted, "It wasn't brilliant, but we already knew that, and the tools are something that we can use going forward."

Using the Intel GPA tools allowed the team to identify a graphical issue where over-large crowd textures were hampering performance. After identifying the problem, they were able to apply mip-mapping to optimize the graphical textures, resulting in an overall performance boost for the match engine.

"We now have the use of this suite of tools across the whole range of Intel target platforms," continued Appleyard. "We can keep running analysis over the lower end, mid end, high end, and in a year's time with the next version of *Football Manager* I think we'll have an improved performance across all Intel® chipsets because of the use of these tools and this extra information that we can now gather."

Moving from the past toward the future, when Appleyard first saw the 2nd Generation Intel® Core™ processor-based machine with GT2 onboard integrated graphics that was delivered to their offices, he wasn't quite sure what to make of its array of LEDs, until Hughes explained that it was designed with laptops in mind as well as desktop machines.

The match engine effortlessly achieved, and even exceeded, the target frame rate of 30 frames per second on medium settings on the 2nd Generation Intel Core processor's integrated chipset, and in the words of Appleyard, "to know that this chipset is actually going to be in a laptop and yet seeing the performance that we got with it is very impressive.

"The old laptops were always considered to be inferior machines," continued Appleyard. "If you talked to someone 10 years ago about integrated onboard graphics, immediately it was, 'oh, here we go, it's going to really chug along.' But that's not the case at all anymore."

It's something that bodes well for the growing legions of fans that play the games on laptops. "We still do have guys that sit at their desktops and have the real high-end stuff," said Appleyard, "but if you look at the middle, a lot of them are running on laptops nowadays, so this improved architecture can only be a good thing."

All to Play For

Ten years into his tenure at Sports Interactive, Appleyard remains boundlessly enthusiastic about *Football Manager*, seeing no end to the annual rounds of improvements and iterations. "There's always extra stuff to put in. We're already gearing up for *Football Manager 2012* and starting to think about features we can put into that. It comes from having that open database. Any idea that anyone thinks of goes in there. We've got literally hundreds of ideas that are planned for later games."

Appleyard is very clear on the overall direction of the series. "Looking forward we'd want to improve the realism of the whole match experience. That's the holy grail for simulation programmers and developers."

Like his compatriots at Sports Interactive, Appleyard is never happier than when he's talking football. So who does he support? "I grew up in the North East so Newcastle United is my team. Although I moved out of there when I was 18 you never leave it. Especially up there, football's in the blood. Bleed black and white and all that, and you never change really. Can you hear my accent coming out there?"

Football's definitely in the blood at Sports Interactive, and it may well be in the water, the beer, and more besides. The team skillfully channels its life's passion through cutting-edge technology to deliver an unmatched experience to millions of fans around the globe. Fans who would no doubt be the first to say, to paraphrase the British football pundits, they got the result they were looking for. ■

ABOUT THE AUTHOR

John Tyrrell's career in the games industry began with the launch of Nintendo's Pokemon on an unsuspecting British public in 1999. After a decade of international PR campaigns, supplemented with work as a freelance writer, he left the position of Worldwide PR Director at Atari in 2009 to establish Hot Socket, a communications consultancy based in Lyon, France.

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